FLOOD PLAIN MANAGEMENT STUDY

CITY OF ATKINS
POPE COUNTY
ARKANSAS

COOPERATING AGENCIES

City of Atkins

Pope County Conservation District

and

The Arkansas Soil and Water Conservation Commission

U. S. Department of Agriculture
Soil Conservation Service
Post Office Box 2323
Little Rock, Arkansas 72203

JUNE 1982

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A. Introduction

The Atkins City Council and the Pope County Conservation District requested the Arkansas Soil and Water Conservation Commission to make a flood plain management study (FPMS) on White Oak Creek and its tributaries West Drain and East Drain, plus North Drain and South Drain (see page 10 vicinity map). The objectives of the City of Atkins and the Pope County Conservation District in requesting the Atkins FPMS were to:

1. Identify flood hazard areas within the City and adjoining areas.

2. Inventory existing flood damageable properties and other flood damageable values and to evaluate the extent of potential damages.

3. Inventory flood plain environmental values (i.e., prime farmlands, fish and wildlife habitats, wetlands, and opportunities for environmental corridors).

4. Identify and evaluate alternative flood plain management strategies.

5. Determine opportunities for the City to implement the alternative flood plain management strategies that are identified.

The Atkins FPMS was prepared in accordance with the August 1974 Joint Agreement for Flood Hazard Analysis and Flood Plain Studies between the Arkansas Soil and Water Conservation Commission (AS&WCC) and the United States Department of Agriculture, Soil Conservation Service (SCS). SCS was designated as the agency to conduct the flood plain management study for the AS&WCC. Participation by the SCS is in accordance with Federal Level Recommendation 3 of "A Unified National Program for Flood Plain Management," and Section 6 of Public Law 83-566. The principles contained in Executive Order 11988, Flood Plain Management, are addressed in this part.

The Atkins study was based in part on information gathered in the field, including level surveys by SCS personnel. The peak flows were based upon statistical methods in absence of stream gage data using SCS Technical Release (TR) 55 and U. S. Geological Survey (USGS) Water Resources Circular No. 11. The water surface elevations were determined for White Oak Creek, East Drain, West Drain, North Drain and South Drain stream reaches using the Water Surface Profile 2 Program (WSP2). The WSP2 is a computational procedure for determining water surface profiles using hydraulic relationships and measured or estimated physical data.

Hydrologic studies involve many factors which change with time and affect the flood elevations and peak discharges. Examples of these variables are existing soil moisture conditions, flood plain and watershed vegetation, and flood flow restrictions. These factors,

along with the unpredictability of precipitation events, make hydrologic studies an approximation of floodwater elevations occurring with a given set of conditions. Factors considered in this study were conditions existing at the time of the field investigations. Elevations determined during this study are considered valid only if hydraulic structures in general remain unobstructed and do not fail.

B. Study Area Description

The Atkins study area is in southeast Pope County, 65 miles northwest of Little Rock, Arkansas (see vicinity map on page 10). The upper reaches of White Oak Creek, East Drain, West Drain and North Drain are on the near vertical sides of Carrion Crow Mountain. These streams drop abruptly to the old stream terraces in broad valleys.

The study reach of West Drain is extensively developed. West Drain flood plain contains the most structures including schools, churches, homes, and two major highways, Arkansas Highway 105 and U. S. Highway 64. White Oak flood plain is developed to a lesser extent with only a few isolated buildings. The East Drain flood plain is predominantly grassland. North Drain and South Drain flood plains are woodland.

The Corps of Engineers published in 1974 a special flood hazard information report for Atkins. The report furnished information concerning flood hazards on White Oak Creek and its tributaries East Drain and West Drain. The report was intended to furnish local governmental agencies, developers, planners, and residents with information for proper land use planning and flood plain management. The report did not present any solutions for solving the flood problems.

The City of Atkins has an ordinance to control development in the flood hazard area. Little development has occurred in the flood plain in recent years.

The Soil Conservation Service was requested to conduct an FPMS in Atkins to determine the flood hazard areas within the city and adjoining areas. In addition to the areas studied by the Corps, the SCS also studies North Drain and South Drain. The SCS was requested to inventory damageable values and identify and evaluate alternate flood plain management strategies. The SCS obtained survey data used in the Corps study and determined that additional survey information was required to conduct the study.

Detailed hydrologic studies were conducted on 7.5 miles of streams, including White Oak Creek (3.1 miles), West Drain (0.7 mile), East Drain (1.4 miles), North Drain (1.0 mile), and South Drain (1.3 miles).

C. Natural Values

1. Soil Resources and Land Use

The upland soils of the Atkins FPMS area are Nella, Enders, Linker and Mountainburg soils. These loamy, shallow soils occur on steep hill sides. The land use on these soils is predominately woodland. In the mid reaches of the study areas are found Mountainburg and Linker soils. Grassland is the main land use of this area. The lowest reaches in the study areas are Leadvale, Taft, Muskogee, McKamie and Wrightsville soils. These deep loamy soils comprise the flood plain. Also, the Leadvale soil, 1 to 3 percent slope, is the major soil on which the City of Atkins is built. Shown in Table 1 below are the land use and prime farmland acreages of the various drainage areas.

TABLE 1
LAND USE AND PRIME FARMLAND (ACRES)

Land Use	North Drain	South Drain	White Oak	East Drain	West Drain	Total
Woodland	284	565	408	92	69	1,418
Grassland	237	1,488	622	331	37	2,715
Cropland	17	78	11	0	0	106
Urban	81	131	327	283	114	936
Total	619	2,262	1,368	706	220	5,175
Prime Farmland (Acres)	287	1,181	0	198	0	1,666
(Percent)	46	52	0	28	0	32

2. Plant and Animal Resources

The study area is composed of an upland area intersected by relatively narrow stream flood plains. For purposes of discussing plant and animal resources, this study area was divided into an upland portion and a flood plain portion. Such a division proved useful in showing differences in natural values.

Upland Areas

Dominant land uses in the uplands include pasture, urban areas, and woodlands. Vegetation in pasture areas is dependent on existing intensity of management. Some pastures

contain mostly single species of grass such as bermuda grass, sudan, or bahaia grass; whereas other pastures contain a variety of plant species including ragweed, bitterweed, Johnson grass and other invading "weeds". Urban areas and rural homesteads have a variety of vegetation ranging from native trees to ornamental shrubs and flowers. Major tree species in the upland forest include post oak, southern red oak, northern red oak, white oak, blackjack oak and black hickory. Typical understory vegetation includes huckleberry, winged elm, and greenbriars.

With respect to wildlife habitat, upland forests provide habitat for white-tailed deer, gray and fox squirrels, Virginia opossum, raccoon, and a variety of birds. Overall upland forest habitat quality would be considered average with the major limitation being shallow soils which often result in drought conditions affecting wildlife food production. Pasture and urban areas in the upland provide fair habitat for cottontail rabbit, bobwhite, and a variety of nongame animals.

Flood Plain Areas

Within flood plain areas, man has influenced natural values more than he has in upland areas. Whereas upland forests cover large areas, flood plain forests consist of small, isolated blocks of woodland within larger expanses of pastureland and urban land. Only three significant areas of flood plain forests exist within the study limits. Two of these woodland areas occur along North Branch and cover a total of 65 acres. Within these two areas existing vegetation is a mixture of species which normally occur in upland and bottomland. Overstory trees include sweetgum, willow oak, white oak, and southern red oak. Understory trees and shrubs include winged elm, red cedar, and deciduous holly. Common ground cover plants include muscadine, greenbriar, Japanese honeysuckle, poison ivy, and Virginia creeper. Based on vegetation neither of the two woodland areas within the North Branch flood plain would be classified as wetland.

The third woodland area within the flood plains occur along the downstream portion of South Branch. This area contains tree species such as water hickory, overcup oak, water oak, willow oak, and green ash. This area is a Type 1 1/ wetland and covers about 90 acres. Wetland characteristics of this area appear to be due to saturated soil conditions. Frequency and duration of flooding in this area do not appear to be great enough to attract waterfowl or other wildlife species that prefer a standing water environment.

1/ Based on USFWS Circular 39

The three tracts of flood plain woodland provide good habitat for gray and fox squirrels, Virginia opossum, raccoon, and a variety of nongame animals. These areas do not appear to be large enough to support white-tailed deer populations.

Except for the three small tracts of woodland, the remaining flood plains are composed of pasture and urban land. Narrow bands of trees such as black willow, willow oak, sweetgum, southern red oak, and white oak occur within pastures and urban areas as a narrow band adjacent to streams. Vegetation and wildlife habitat quality in pastures and urban areas within flood plains were similar to those for upland pastures and urban areas; however, native trees in flood plain areas included species such as willow oak and sweetgum that were absent in upland areas. Trees along streambanks within urban and pasture flood plain areas provide edge habitat for species of wildlife such as rabbits that prefer an openland habitat. Such vegetation along streambanks is not extensive enough to support significant populations of woodland wildlife such as deer and squirrel.

3. Streams and Fish

Streams within the study area exhibit intermittent water flow. Water flow is lacking except during winter, spring, and after major rainfall events in the summer and fall. This lack of water flow results in a lack of a sport fishery. Fish that are present include such species as mosquitofish and green sunfish that can exist in isolated shallow pools where low dissolved oxygen and elevated water temperatures are common.

4. Water Quality

Water quality within all of the streams is influenced by urban runoff from streets. White Oak Creek receives effluent from sewage lagoons operated by the City of Atkins. This effluent is discharged at the downstream edge of the study area. Effluent from local industries may also result in impacts to the water quality of White Oak Creek.

5. Summary of Natural Values

Overall, natural values of the flood plains of the study area have been greatly influenced by man. Plans to preserve existing natural areas should focus on retaining the three significant tracts of woodland remaining. Urban development within these areas should be discouraged. In addition, channelization of the South Drain Complex will result in negative impacts to Type 1 wetland if water tables are lowered.

D. Flood Problems

A 1 percent chance event inundates 469 acres along the streams in the study area. The area covered by this event is shown in the flood plain management area maps, pages 11 to 19. Table 2 lists the 1 percent chance flood plain land use for each stream.

TABLE 2
FLOOD PLAIN LAND USE AND PRIME FARMLAND (ACRES)

Land Use	North Drain	South Drain	White Oak	East Drain	West Drain	Total
Woodland	34	64	0	0	0	98
Grassland	25	65	144	34	0	268
Urban	2	0	54	13	34	103
Total	61	129	198	47	34	469
Prime Farmland (Acres)	59	129	0	34	0	222
(Percent)	97	100	0	72	0	47

Potential flood damages are the greatest in the West Drain floodplain. In June 1957, the Atkins Chronicle reported water a foot deep on the floor of a garage located at the corner of Church Street and U. S. Highway 64. Other buildings reported by residents to have received flood damages were the high school facilities, a church, homes, and Main Street businesses.

The following table lists structures subject to flooding and expected damages from a 1 percent chance event.

TABLE 3
FLOODING AND DAMAGES FROM A 1 PERCENT CHANCE EVENT

Stream	Structures Subject to Flooding			Damages (Dollars)
	Residences	Commercial	Other 1/	
	----------Numbers----------			
White Oak	0	1	0	2,000
West Drain	13	7	6	80,000
East Drain	2	0	0	6,000
North Drain	0	0	0	0
South Drain	0	0	0	0
Totals	15	8	6	88,000

1/ Includes 2 churches and 4 school buildings

The boundary of the flooded area is shown in the flood plain management area maps pages 11 to 19. Profiles of the streams are in the Technical Appendix. These two items can be used to determine the extent of flooding and the computed 1 percent and 10 percent chance flood elevations at a selected location.

E. Existing Flood Plain Management

The City of Atkins is participating in the flood insurance program; however, a detailed flood insurance study has not been made. An ordinance is in effect to control development within the flood hazard areas. The cited Corps of Engineers report has been available to determine flood elevations.

F. Alternatives for Flood Plain Management

1. Present Conditions

Little development is presently occurring in the flood plain identified in this report as most of the properties were built a number of years ago. Recent development has occurred outside the flood plain and has probably caused an increase in the amount and rate of runoff and subsequent flooding in the flood plain. The trend of development outside the flood plain should continue because the local officials are aware of the flood problem as a result of the Corps of Engineers report and this report. Residents of the area are eligible to purchase insurance under the emergency flood insurance program.

2. Preservation of Natural Values

Three tracts of woodland have been identified as significant in the flood plain. Two of the areas occur along North Branch and total 65 acres. They include a mixture of species normally occurring in upland and bottomland woodland. The third area, a Type 1 wetland, totals 90 acres and is located along the downstream portion of South Branch.

Management options to preserve these areas include restricting development with zoning ordinances, land use regulations, land purchase, or preservation easements. The Type 1 wetland could be protected by prohibiting channelization which would lower the water table.

3. Nonstructural Measures

Nonstructural measures identified as feasible for solving flood problems in Atkins include floodproofing, relocation and/or acquisition, flood insurance, and building or development codes. There are 29 structures in Atkins subject to damage from a 1 percent chance flood including 15 residences, eight commercial buildings, two churches, and four school buildings. The estimated value of these properties is $829,000. Following is a discussion of the potential of the identified nonstructural measures for solving the flood problems.

Floodproofing - Floodproofing includes elevating structures above the 1 percent chance flood elevation or installing measures on individual structures to prevent water from entering. Five residences could be elevated above the 1 percent chance flood elevation with the maximum increase in elevation being two feet.

The estimated cost of elevating these residences is $15,000. Elevation of the structures would require landscaping in order to make this method acceptable to the residents. The type of floodproofing would vary for each building but should be relatively inexpensive. This alternative fails to provide relief from damage to the majority of the properties subject to flooding because they do not lend themselves to this type of protection.

Relocation and/or Acquisition - Relocation consists of moving structures a short distance to a flood-free area. There are five buildings which could be relocated at a cost estimated to be $15,000. Acquisition of the structures would require purchase of the structures, removing them from the flood plain, and restricting land use in the flood plain. This alternative would probably not be acceptable because of the high cost, and only a few properties would be protected.

Flood Insurance - Flood insurance is available in Atkins under the emergency program as no detailed study has been published. While flood insurance will not prevent flood losses, it will reimburse property owners for flood damages. Hydraulic data developed during this study should be sufficient for flood insurance purposes.

Building or Development Codes - Building or development codes are a method of preventing flood losses through the control of development in flood prone areas and by requiring that certain structural features be included in any buildings erected. Codes to control development would require enforcement by local authorities to be effective, and should be acceptable by the residents of Atkins.

4. Structural Measures

Structural measures include features to modify the flood or control the flood to reduce losses. Structural measures include dams, channels, dikes, or other appropriate means. No dam sites are available in Atkins and dikes are not an appropriate means. Identified structural measures include channel work and alteration of roads and bridges.

A channel modification alternative capable of reducing flood losses includes a channel designed to carry a 10 percent chance peak discharge on part of White Oak Creek. West Drain would be modified to carry a four percent chance peak discharge. Two structures on the Missouri Pacific Railroad would require modification as would two structures on U. S. Highway 64 and one structure on Arkansas Highway 105. City streets requiring new road structures include NW 1st, NW 2nd, South Church, SW 1st, Avenue 3 NW, and Avenue 4 NW. Channels would be deepened and widened and would require riprap to prevent erosion due to excessive channel velocities. Estimated cost of this alternative is in excess of $2,500,000.

5. Combination of Alternatives

Participation in the flood insurance program, floodproofing of individual structures, and the enforcement of building or development codes appears to be the best cost effective and socially acceptable combination of alternatives for the City of Atkins. Residents could be made aware of the availability of flood insurance through an educational program conducted by local officials. Assistance could be given to individuals on the best method of floodproofing their property and existing building and development codes could be revised as necessary and enforced to control development in the flood plain.

LEGEND

City Limits

Stream Study Reaches

14 Photomap Sheet Coverage

VICINITY MAP AND FLOOD PLAIN MANAGEMENT AREA PHOTOMAP INDEX

CITY OF ATKINS, ARKANSAS

FLOOD PLAIN MANAGEMENT STUDY

U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

LITTLE ROCK, ARKANSAS

0 2000 4000 6000 Feet

0 1 Kilometer

Approximate Scale

NOVEMBER 1974 FLIGHT

Map Source: Arkansas Highway and Transportation Department

USDA—SCS—FORT WORTH, TEXAS 1982

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ATKINS FLOOD PLAIN MANAGEMENT STUDY
POPE COUNTY, ARKANSAS

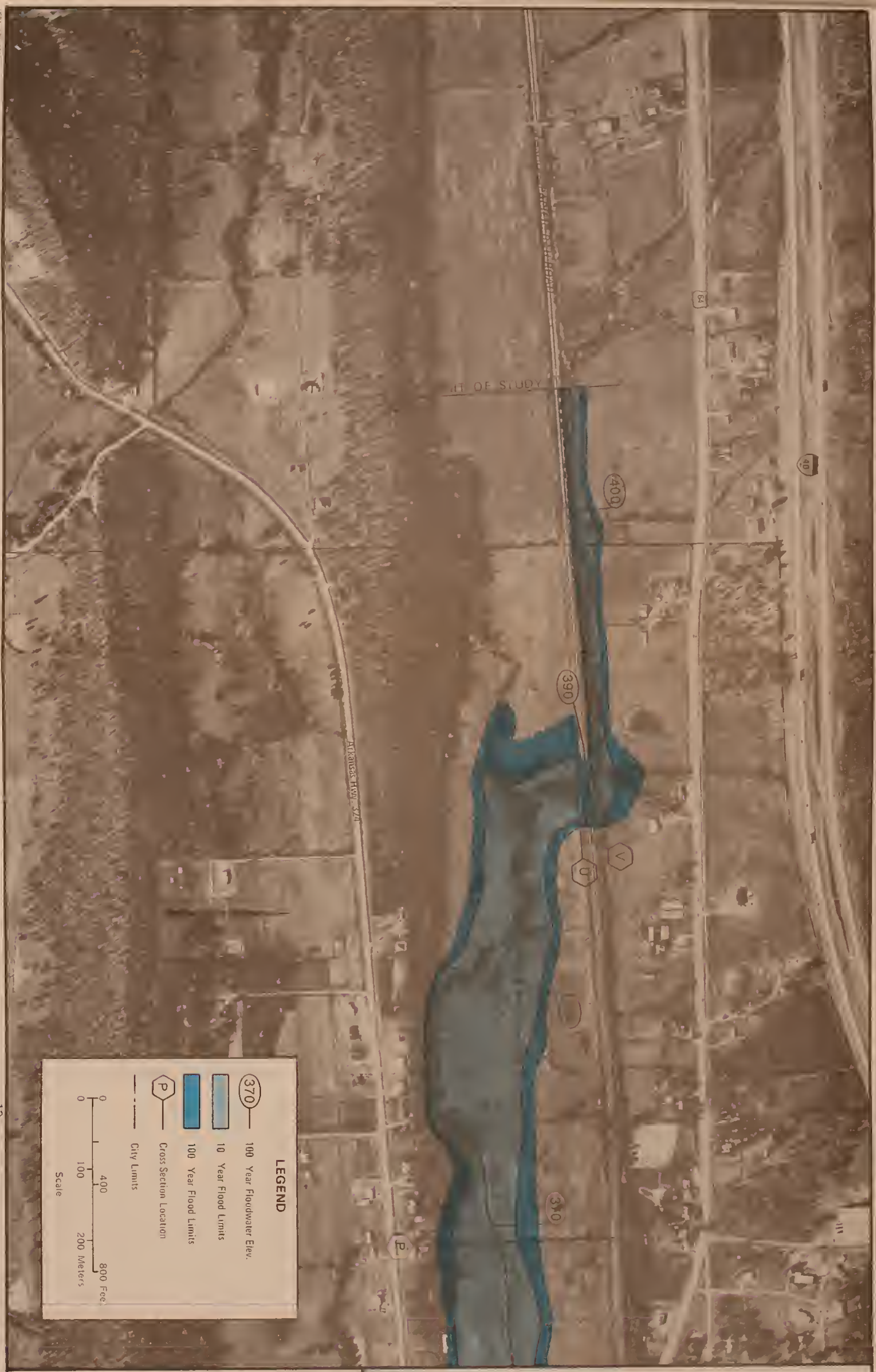
FLOOD PLAIN MANAGEMENT AREA

NORTH DRAIN

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ATKINS FLOOD PLAIN MANAGEMENT STUDY
POPE COUNTY, ARKANSAS

FLOOD PLAIN MANAGEMENT AREA

NORTH DRAIN, EAST DRAIN AND WEST DRAIN



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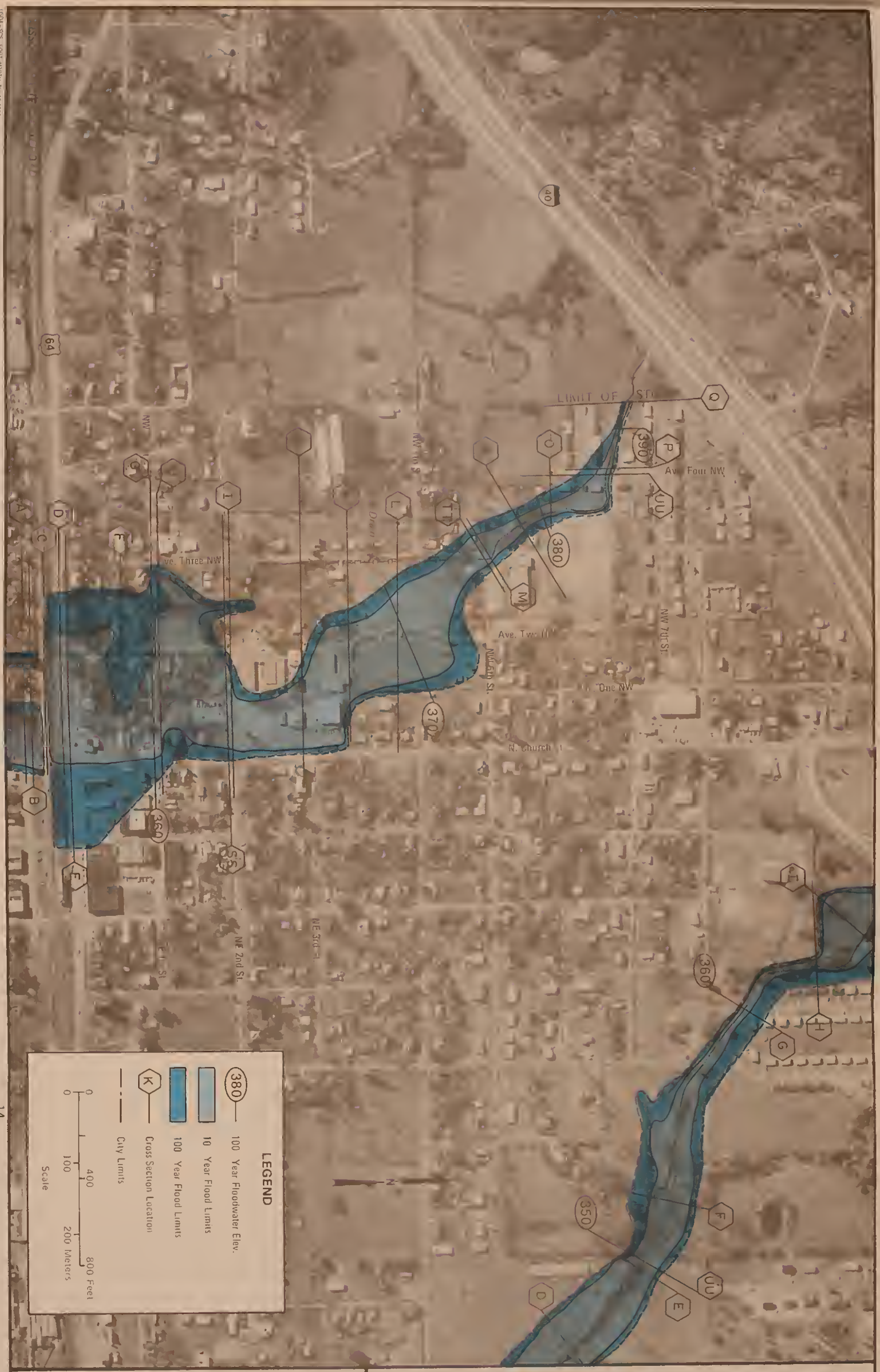
ATKINS FLOOD PLAIN MANAGEMENT STUDY
POPE COUNTY, ARKANSAS

FLOOD PLAIN MANAGEMENT AREA

WHITE OAK CREEK



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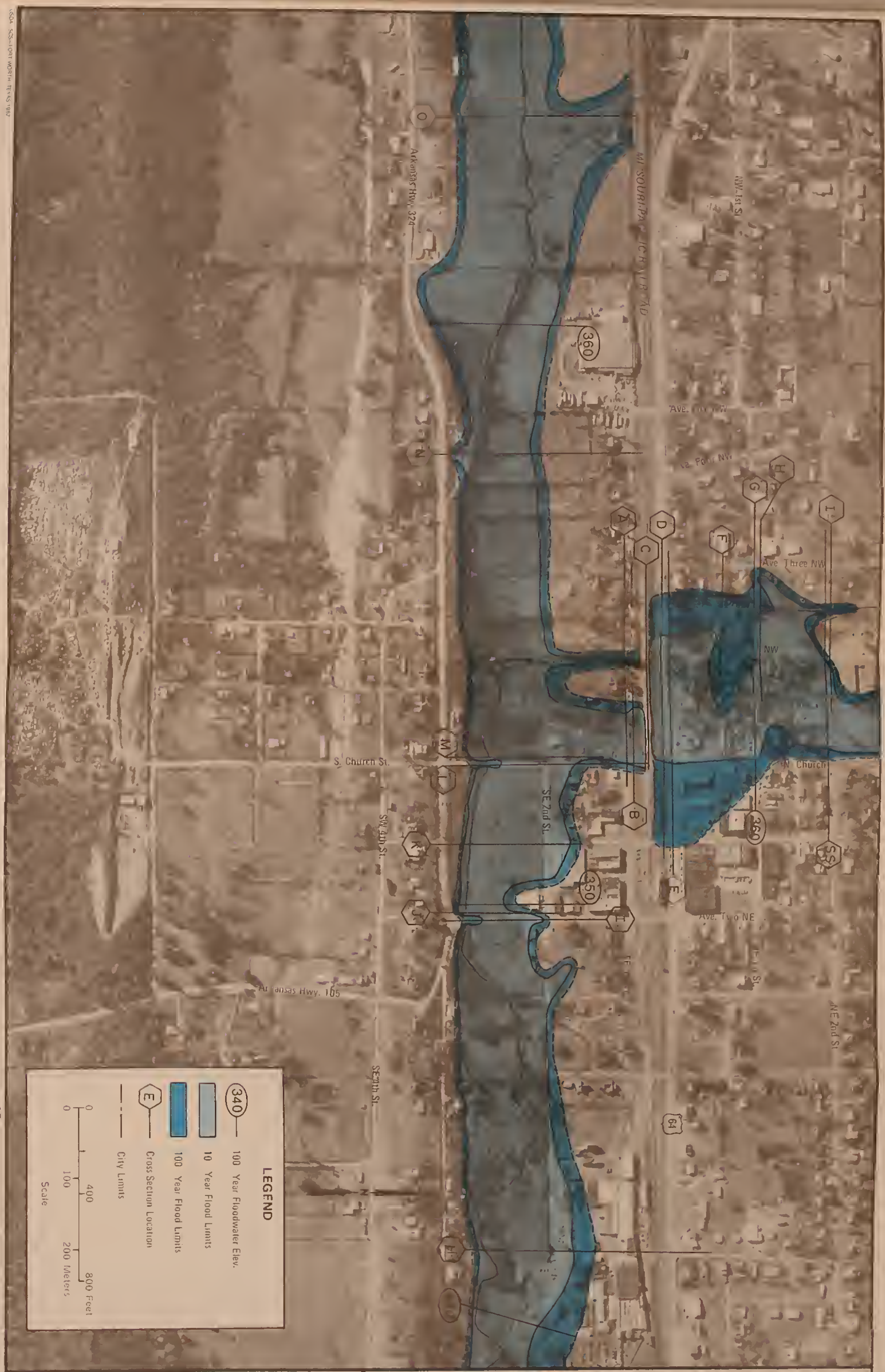
SOIL CONSERVATION SERVICE
ATKINS FLOOD PLAIN MANAGEMENT STUDY
POPE COUNTY, ARKANSAS

FLOOD PLAIN MANAGEMENT AREA

WEST DRAIN AND EAST DRAIN



USDA SCS-FORT WORTH TEXAS 1982

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ATKINS FLOOD PLAIN MANAGEMENT STUDY
POPE COUNTY, ARKANSAS

FLOOD PLAIN MANAGEMENT AREA

WHITE OAK CREEK AND WEST DRAIN

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POPE COUNTY, ARKANSAS

FLOOD PLAIN MANAGEMENT AREA

SOUTH DRAIN

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ATKINS FLOOD PLAIN MANAGEMENT STUDY
POPE COUNTY, ARKANSAS

FLOOD PLAIN MANAGEMENT AREA

SOUTH DRAIN

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POPE COUNTY, ARKANSAS

FLOOD PLAIN MANAGEMENT AREA

EAST DRAIN AND WHITE OAK CREEK

USDA-SCS-1087 (NORTH) TEXAS 1982

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ATKINS FLOOD PLAIN MANAGEMENT STUDY
POPE COUNTY, ARKANSAS

FLOOD PLAIN MANAGEMENT AREA

WHITE OAK CREEK AND EAST DRAIN

GLOSSARY

Storm Duration: The time during which rainfall occurs.

Flood Damages: The destruction or injury of property due to rising water levels. In this study, flood damages were assumed to occur when the flood water elevation equaled or exceeded the lowest opening point into the structure.

Flood Frequency: An expression or measure of how often a hydrologic event of given size or magnitude should, on an average, be equaled or exceeded. For example, a 10-year frequency flood is equaled or exceeded in size, only once in 10 years on the average or has a 10 percent chance of occurring during any given year.

Flood Plain: A land area next to a stream which is periodically covered by floodwater.

Flood Proofing: Changing a structure and/or its contents so that either water is kept out of the structure or the damage caused by water entry is reduced.

Flow Restrictions: An obstacle which limits the volume of water which passes through a specific section: for example, dikes, dense vegetation, levees, culverts, bridge openings, buildings and/or similar structures.

Level Surveys: The gathering of data with engineering equipment using horizontal and vertical distances to depict the features of stream valleys.

Peak Discharge or Peak Flow: The maximum volume of water per unit time that is expected to run off from an area.

Percent Chance: 100 divided by the flood frequency in years.

Prime Farmland: The soil that is best suited for producing food, feed, forage, fiber and oilseed crops. It gives the highest yields with minimum inputs of energy and money and results in the least damage to the environment. It includes all capability Class I soils, more than 80 percent of Class II soils, and less than a third of the Class III soils.

BIBLIOGRAPHY

1. Patterson, James L., Floods in Arkansas, Magnitude and Frequency Characteristics Through 1968, Water Resources Circular No. 11, U. S. Geological Survey, Little Rock, Arkansas, 1971.

2. Soil Survey of Pope County, Arkansas, U. S. Department of Agriculture (USDA), SCS and Forest Service in Cooperation with Arkansas Agricultural Experiment Station, April 1981.

3. Technical Release 55, Urban Hydrology for Small Watersheds, Engineering Division, USDA, SCS, January 1975.

4. Technical Release 61, WSP2 Computer Program, Engineering Division, USDA, SCS, May 1975.

5. Circular 39, Wetlands of the United States, U. S. Department of the Interior, Fish and Wildlife Service, 1956.

6. Special Flood Hazard Information, White Oak Creek and Tributaries, Atkins, Arkansas, Corps of Engineers, Little Rock District, October 1974.

BENCHMARK DATA

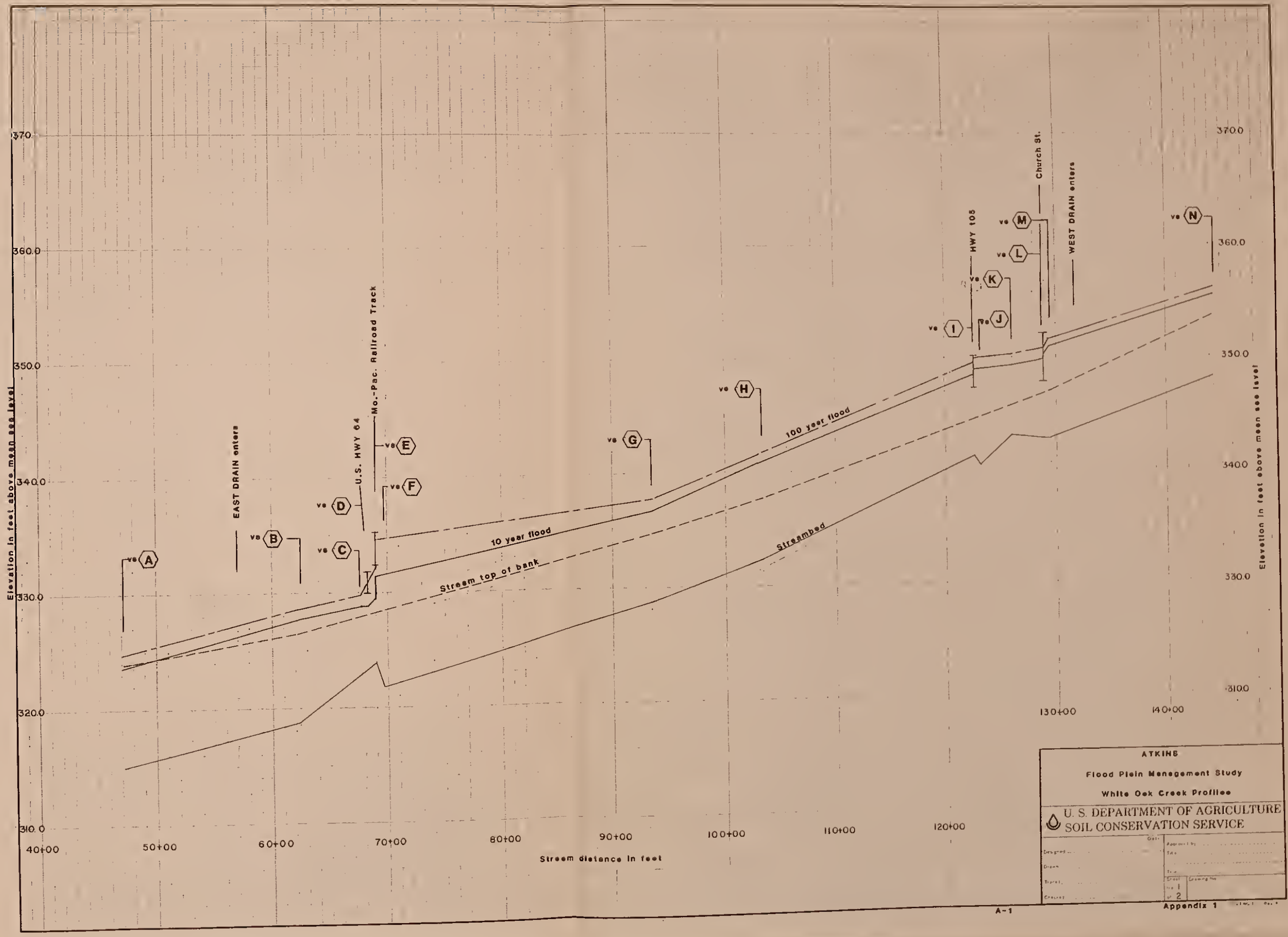
Elevation: 395.21 m.s.l.
Designation: C66
Description: Two miles north of Atkins along State Highway 105, near the center of Section 8, Township 7 North, Range 18 West, 265 feet south and 55 feet east of center of highway at a drive east; 55 feet normal to and on the east side of the highway; 10 feet south of a power pole; 12 feet east of the east right-of-way fence; in the top of a concrete post; a standard USC&GS disk stamped "C 66 1935".

Elevation: 386.18 m.s.l.
Designation: G72
Description: 1.2 miles west along the Missouri Pacific Railroad from Atkins, Pope County, 450 feet south of the Ray Kendrick residence, at a farm road crossing, 49 feet southeast of the centerline of the road, 47 feet southeast of the centerline of the road, 47 feet south of the centerline of the track, 5 feet northeast of the east end of an iron gate, and 2 feet north of a fence paralleling the track. A standard disk, stamped "G 72 1934" and set in the top of a concrete post.

Elevation: 359.97 m.s.l.
Designation: H72
Description: At Atkins, Pope County, at the southwest corner of Atkins City Hall, ex-Missouri Pacific Railroad Station. Sixteen inches east of the southwest corner of the Station, 3 feet above the brick walk, 24 feet north of the centerline of the main track. A standard disk, stamped "H 72 1934".

Elevation: 352.04 m.s.l.
Designation: J72
Description: At Atkins, Pope County, on the Missouri Pacific Railroad, 14 feet west of the southwest corner of a Catholic church, 27 feet north of the southwest corner of the churchyard, 150 feet north of the track. A standard disk, stamped "J 72 1934" and set in the top of a concrete post.

TECHNICAL APPENDIX



ATKINS

Flood Plain Management Study

White Oak Creek Profiles

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

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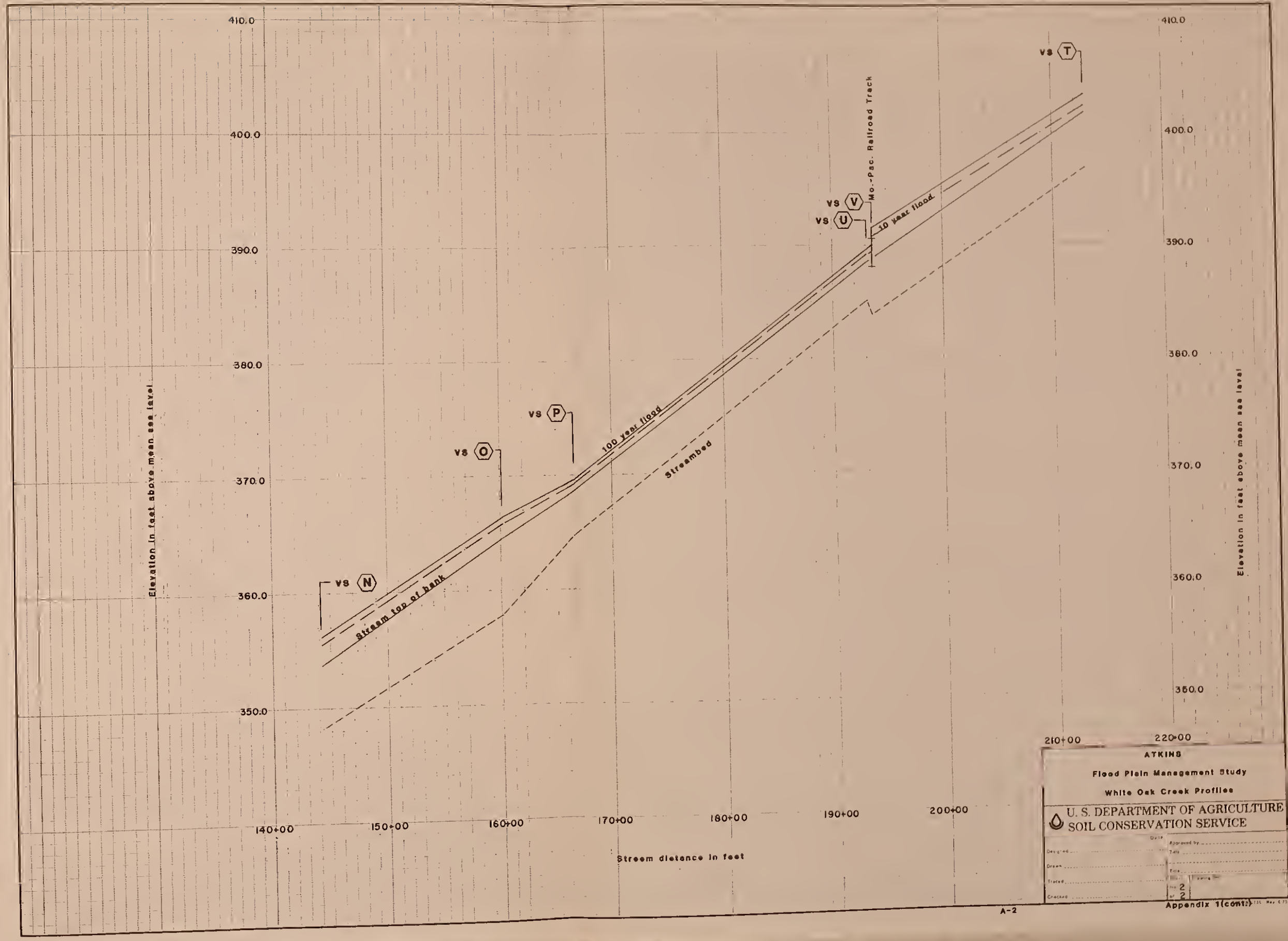

ATKINS

Flood Plain Management Study

White Oak Creek Profiles

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

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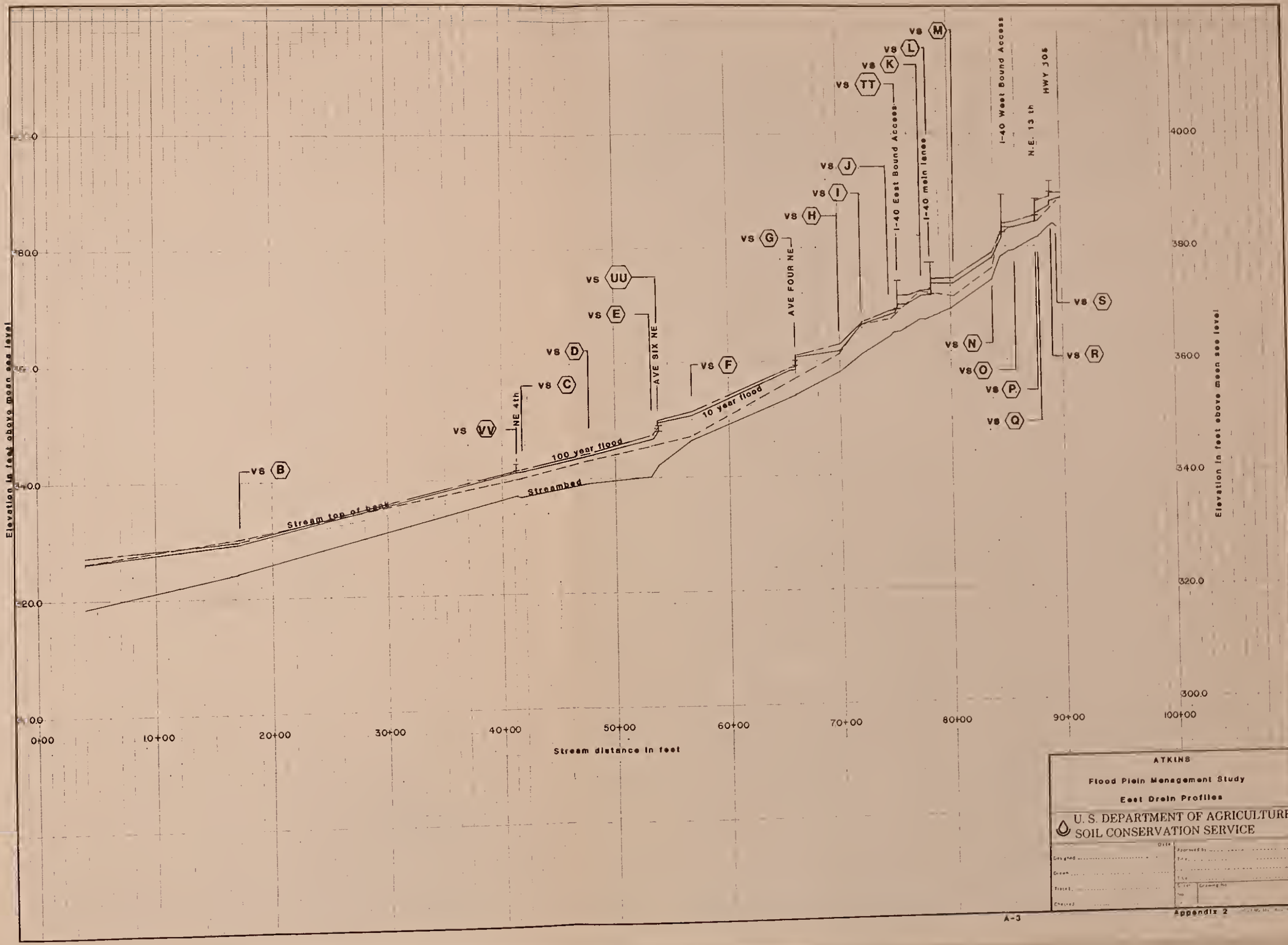
Appendix 1(cont.)



ATKINS

Flood Plain Management Study

East Drain Profiles

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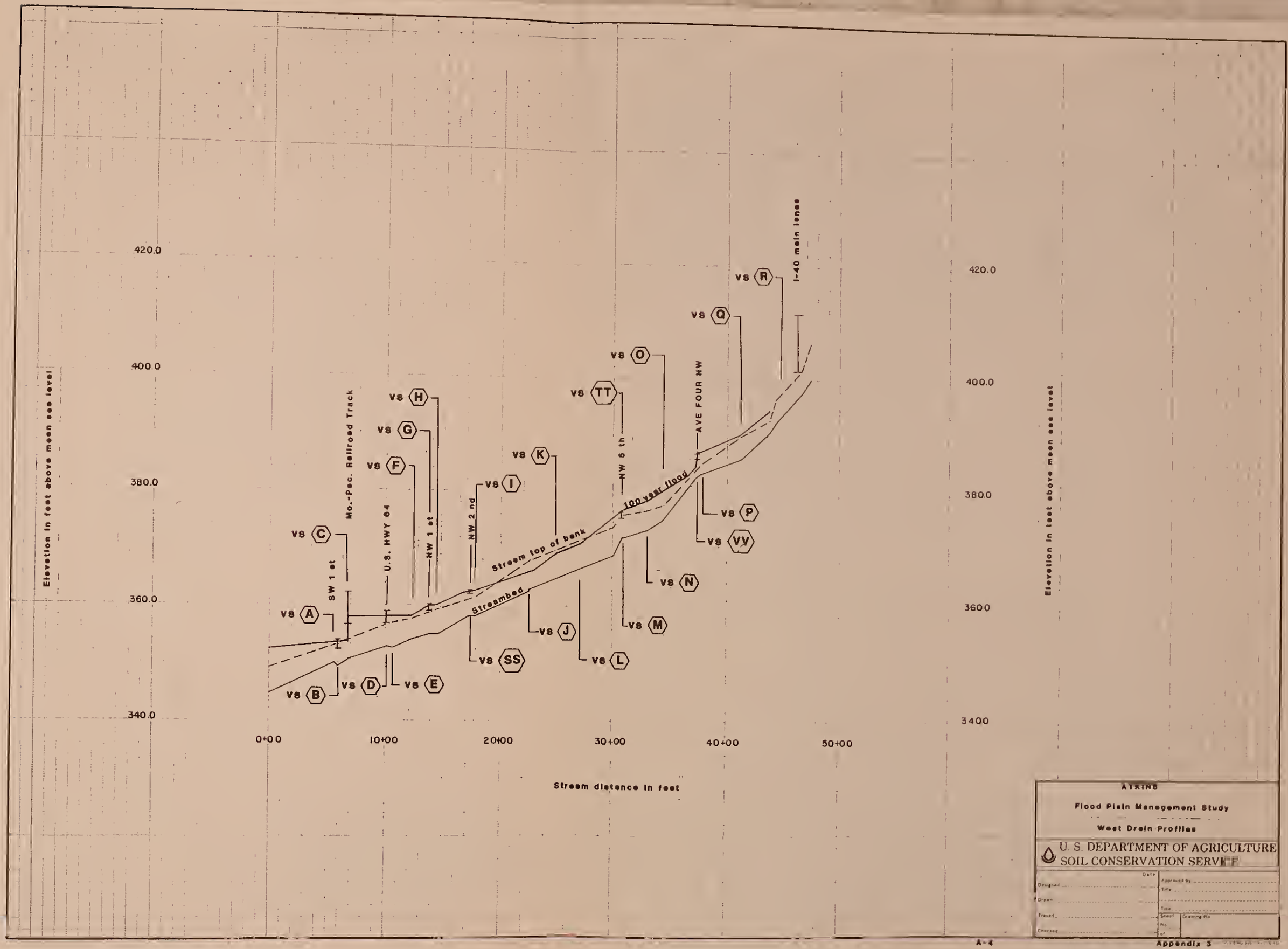

ATKINS

Flood Plain Management Study

West Drain Profiles

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SOIL CONSERVATION SERVICE

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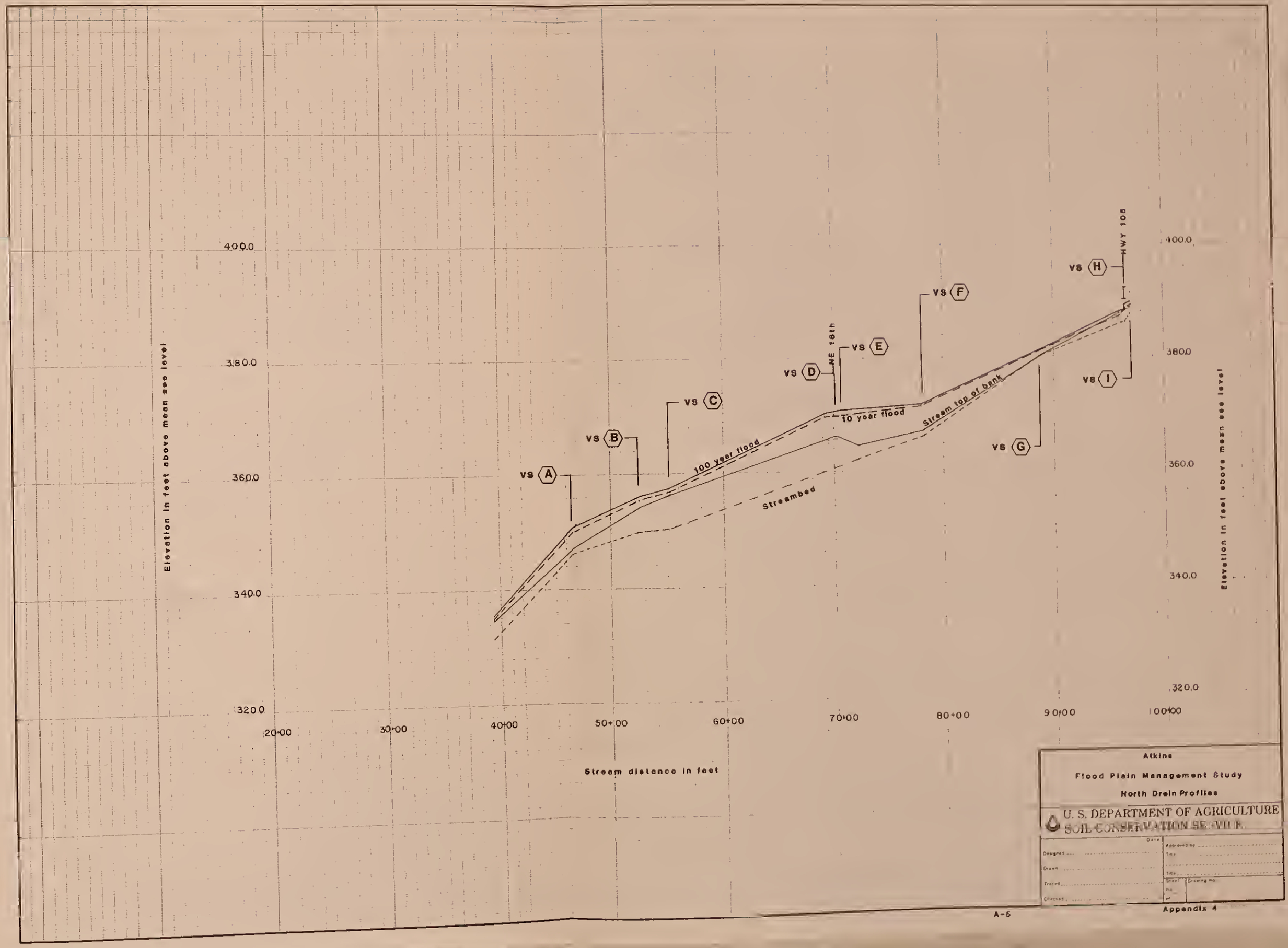

Atkins

Flood Plain Management Study

North Drain Profiles

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SOIL CONSERVATION SERVICE

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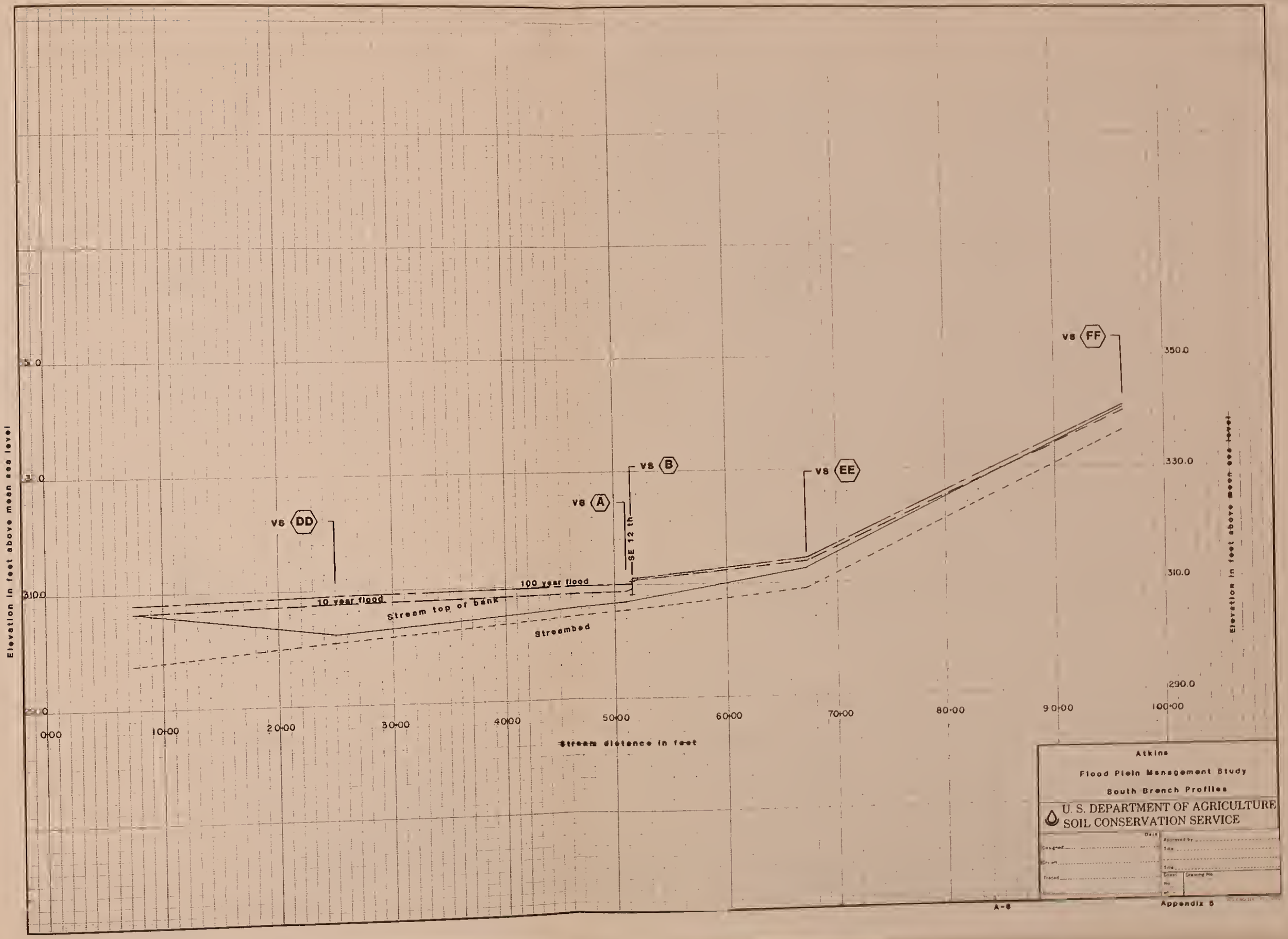

Atkins

Flood Plain Management Study

South Branch Profiles

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SOIL CONSERVATION SERVICE

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left looking upstream (LLUS)

distance in feet

cross section A-SW 1ST

right looking upstream(RLUS)

distance in feet

N. Church St.

ELEVATION IN FEET M.S.L.

LLUS

distance in feet

cross section D - US HWY 64

RLUS

distance in feet

N Church St.

LLUS

distance in feet

cross section SS - NW 2ND

RLUS

distance in feet

LLUS

distance in feet

cross section UU -AVE FOUR NW

RLUS

distance in feet

Alkine

Flood Plain Menegement Study

West Orein

Selected Cross Sections

U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

ROAD CROSSING SECTION DATA

Cross Section	Drainage Area 1/	Peak Flow 2/		Headwater Flood Elevation 3/		Street Name
		10-Year	100-Year	10-Year	100-Year	
	(AC)	-------CFS---------		-------FT---------		
White Oak Creek						
D	1,536	1,299	2,498	328.7	330.9	U. S. Hwy. 64 E. of Atkins
E	1,408	1,214	2,334	330.3	334.6	Mo.Pac. Railroad E. of Atkins
I	1,408	1,214	2,334	348.9	349.9	Ark. Hwy. 105
L	1,344	1,331	2,284	350.2	350.8	S. Church Street
V	472	766	1,315	390.9	391.6	Mo.Pac. Railroad W. of Atkins
East Drain						
VV	422	506	846	341.2	341.5	N.E. 4th Street
UU	362	557	927	349.5	349.9	Ave. Six N.E.
G	331	679	1,136	360.9	361.0	Ave. Four N.E.
L	162	324	559	373.6	374.5	I-40 Main Lanes
P	126	302	526	385.8	388.1	N.E. 13th Street
R	126	302	526	388.0	389.5	Ark. Hwy. 105 N.
West Drain						
B	220	377	630	353.1	353.5	S.W. 1st Street
C	220	377	630	355.7	358.0	Mo.Pac. Railroad
D	220	377	630	356.0	358.0	U. S. Hwy. 64
G	220	377	630	359.4	359.9	N.W. 1st Street
SS	184	347	589	362.2	362.4	N.W. 2nd Street
TT	184	347	589	376.4	376.7	N.W. 5th Street
VV	110	259	447	387.0	387.1	Ave. Four N.W.

1/ Drainage area is in acres

2/ Peak flows, cubic feet per second, computed by SCS TR-55 or as described in Floods in Arkansas, Magnitude and Frequency Characteristics Through 1968, Water Resources Circular No. 11, U. S. Geological Survey, 1971.

3/ Headwater flood elevation in feet above mean sea level.

CROSS SECTION DATA

Cross Section	Drainage Area 1/	Peak Flow 2/		Floodwater Elevation 3/	
		10-Year	100-Year	10-Year	100-Year
	(AC)	-------CFS---------		--------FT---------	
North Drain					
A	596	672	1,154	349.9	350.6
B	580	704	1,208	355.4	356.0
C	543	635	1,090	356.5	357.3
D	360	521	899	369.9	370.5
E	360	521	899	369.9	370.8
F	228	319	550	371.4	371.7
G	179	307	530	381.0	381.1
H	121	240	421	388.5	389.3
I	121	240	421	389.2	389.6
South Drain					
DD	2,304	1,783	3,427	307.7	309.1
A	1,536	1,299	2,498	308.9	310.0
B	1,536	1,299	2,498	310.8	311.1
EE	337	428	745	313.8	314.4
FF	121	199	359	339.9	340.9

1/ Drainage area is in acres

2/ Peak flows, cubic feet per second, computed by SCS TR-55 or as described in Floods in Arkansas, Magnitude and Frequency Characteristics Through 1968 Water Resources Circular No. 11, U. S. Geological Survey, 1971

3/ Floodwater elevation in feet above mean sea level.

Investigation and Analysis

The data used to establish the different flood frequency elevations shown in this report were gathered by SCS personnel. The flood plain topography was determined by level surveys of the five stream study reaches. Level surveys were referenced to a standard Department of Commerce, Coast and Geodetic Survey benchmark.

Peak discharge values were computed for the different drainage areas at the respective cross sections. SCS Technical Release 55 (TR 55) and Arkansas Geological Commission Water Resources Circular 11 (WRC 11) were used to compute the 1 percent and 10 percent chance peak flows. The values of peak flows computed by the two procedures were compared and the higher value was used in this study. The results were that for drainage areas under 1,400 acres a higher value of peak flow was obtained using TR 55 and for drainage areas over 1,400 acres, WRC 11 gave a higher discharge value. The reason for this procedure was an attempt to duplicate the discharges used in the October 1974, Special Flood Hazard Information, which was published by the U. S. Corps of Engineers. Survey data were combined with peak discharges and incorporated into the Water Surface Profile 2 (WSP 2) computer program by SCS personnel. A discharge versus elevation curve was constructed from the WSP 2 output for each cross section used in the study. Utilizing the curves and the peak discharge values, the various flood elevations were determined. The flood elevations were transferred to their respective plotted cross sections yielding the widths of the 1 percent and 10 percent chance flood plains. The horizontal distances were transferred to the aerial photographs purchased from the United States Department of Agriculture, Agricultural Stabilization and Conservation Service Aerial Photography Field Office in Salt Lake City, Utah. The SCS Cartographic Unit processed the flood plain management area maps for inclusion in this report.

Upon inspection of the West Drain flood plain map, one will note that it leaves the area adjacent to the channel and meanders through a residential and school area. Examples of West Drain cross sections are shown in Appendix 6. The cross sections show that when water goes out of bank at street crossings, it flows away from the channel. This is the reason for a flood plain area separate from the channel.

A second point of special consideration is a 6 feet diameter by 755 feet long storm drain which abruptly changes upstream to a 3 feet by 5 feet by 70 feet long rectangular concrete box. The complex culvert's upstream beginning point is NW 5th Street. The procedure used to account for the influence of this structure was to manually compute the flow through the culvert at the level the water overtops the street. The computed culvert capacity at the involved cross sections was subtracted from the peak flows to calculate the discharge used in determining the floodwater elevations.

Since there is an existing flood hazard report prepared by the Little Rock District Corps of Engineers, the resulting flood elevations from the two reports were compared. The differences in the two reports were resolved by SCS and Corps personnel to produce a common 1 percent chance flood elevation. The results were the lowering of the 1 percent chance frequency flood level in the area of West Drain and the Missouri Pacific Railroad approximately 3.5 feet. The reason warranting the lowering of the floodwater elevation in the area was the accuracy of the surveys. The surveys used in the 1974 report extended to the stream top of bank and additional points were obtained from USGS topographic quadrangles. The 1981 surveys extended a greater distance from the channel. The remaining sections of water surface profiles for the different streams matched closely. The number of buildings subject to floodwater damage was determined by comparing the flood water elevations to the elevation of the lowest point of entry of the structure. The lowest point of entry is an opening such as a basement window, door frame or other similar point. Estimates of flood losses were obtained from the depth of flooding in the structures and the type and value of the structures.

The Atkins FPMS study area and the stream study reaches were evaluated by a staff biologist and a resource conservationist. A field reconnaissance was conducted. Aerial photographs and published soil surveys were also utilized in determining natural values and prime farmland in the study area. This information has been incorporated into this report.

After completing the hydrology and hydraulic studies and resolving the report findings with the Corps of Engineers, a public meeting was held on March 9, 1982, at 7:00 p.m. This meeting was advertised in the Atkins Chronicle and was attended by 10 local people. The presentation consisted of methodology, showing of flood plain maps and flood profiles, and alternatives to reduce flood plain damages. Response of those present was that White Oak Creek flood plain was the area of concern. Generally, the residents attending agreed to the flood limits shown on the maps. Interests present at the meeting were Atkins City Council, Corps of Engineers and Pope County Conservation District Board.